CLAIMS

1. An optical device for controlling insertion loss of wavelength-division multiplexed signals comprising a plurality of signals, each signal having a predetermined wavelength different from the remaining signals, the optical device comprising:

a phased array having a proximal end and a distal end, said phased array comprising a plurality of waveguides extending between said proximal and distal ends, each said waveguide having a predetermined length different from another waveguide;

at least one proximal waveguide having a first end and a second end;

a proximal slab waveguide between said proximal end of said phased array and said second end of said proximal waveguide;

a plurality of distal waveguides each having a first end and a second end, at least one of said plurality of distal waveguides includes at least one gap between said first and second ends; and

a distal slab waveguide between said distal end of said phased array and said second end of said distal waveguide.

2. The optical device of claim 1, wherein said gap of each of said distal waveguides varies between said plurality of distal waveguides.

3. The optical device according to claim 2, wherein said plurality of distal waveguides are arranged in an order and a width of said gap is largest towards a center axis of said distal slab waveguide.

4. The optical device according to claim 2, wherein said gap of each distal waveguide is selected to contribute to an insertion loss for each distal waveguide such that a difference in total insertion loss between each of said plurality of distal waveguides is minimized.

5. The optical device according to claim 1, wherein at least one of said gaps forms an angle with said distal waveguide in a plane of the distal waveguide.

6. The optical device according to claim 5, wherein said angle equals is measured between a face of said distal waveguide adjacent to said gap and a side of said distal waveguide, and said angle is between 70 and 80 degrees.

7. The optical device according to claim 6, wherein said angle is 82 degrees.

8. The optical device according to claim 1, wherein at least one of said gaps forms an angle with an axis orthogonal to a plane of said distal waveguide.

9. The optical device according to claim 5, wherein said angle equals is measured between a face of said distal waveguide adjacent to said gap and said axis, and said angle is between 70 and 90 degrees.

10. The optical device according to claim 9, wherein said angle is 82 degrees.

11. The optical device according to claim 1, wherein at least one of said distal waveguides includes more than one of said gaps.

12. The optical device according to claim 1, wherein at least one of said gaps extends only partially through one of said distal waveguides.

13. The optical device according to claim 1, wherein at least one of said distal waveguides having said gap includes a first portion and a second portion on either side of said gap, and wherein said first and said second portions are misaligned by an offset distance.

14. The optical device according to claim 1, wherein at least one of said distal waveguides having said gap includes a gap material placed within said gap.

15. The optical device according to claim 14, wherein a width of said gap having said gap material is greater than a width of said gap material.

16. The optical device according to claim 14, wherein said gap material comprises an offset section of distal waveguide.

17. The optical device according to claim 1, wherein said optical device is a planar lightwave circuit.

18. The optical device according to claim 1, further comprising at least one gap between in at least one of said plurality of proximal waveguides, wherein said gap is located between said first and second ends of said distal waveguide.

19. A method controlling insertion loss between a plurality of input or output signals of an optical device comprising the act of transmitting at least one of the signals across at least one distal waveguide having a gap.

20. The method of claim 19, wherein the act of transmitting comprises transmitting the plurality of signals across a plurality of distal waveguides each having a respective gap which varies in width.

21. The method of claim 20, wherein the width of each respective gap decreases away from a center waveguide of the plurality of waveguides.

22. The method of claim 19, wherein the gap forms an angle with the distal waveguide.

23. An optical device for controlling insertion loss of wavelength-division multiplexed signals comprising a plurality of signals, each signal having a predetermined wavelength different from the remaining signals, the optical device comprising:

a phased array having a proximal end and a distal end, said phased array

comprising a plurality of waveguides extending between said input and output ends, each said waveguide having a predetermined length different from another waveguide;

at least one proximal waveguides each having a first end and a second end, at least one of said proximal waveguides includes at least one gap between said first and second ends

a proximal slab waveguide between said proximal end of said phased array and said second end of said proximal waveguide;

a plurality of distal waveguides each having a first end and a second end; and

a distal slab waveguide between said distal end of said phased array and said second end of said distal waveguide.

24. An optical device for controlling insertion loss of wavelength-division multiplexed signals comprising a plurality of signals, each signal having a predetermined wavelength different from the remaining signals, the optical device comprising:

an phased array having a proximal end and a distal end, said phased array comprising a plurality of waveguides extending between said input and output ends, each said waveguide having a predetermined length different from another waveguide;

at least one proximal waveguide having a first end and a second end;

a proximal slab waveguide between said proximal end of said phased array and said second end of said proximal waveguide;

a plurality of distal waveguides each having a first end and a second end,

at least one means for controlling insertion loss of the signal transmitted through either said distal and/or proximal waveguide, said means for controlling insertion loss located between said first and second ends of either said distal and/or proximal waveguide; and

a distal slab waveguide between said distal end of said phased array and said second end of said distal waveguide.